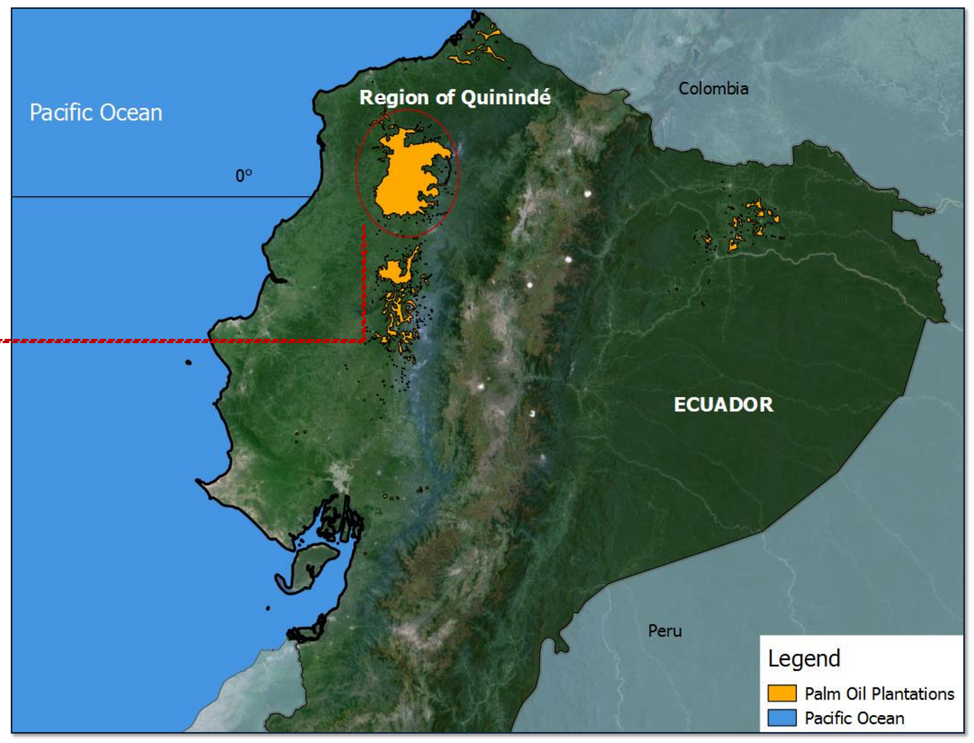
Will El Niño increase oil palm yield in Ecuador?

A new perspective on a global climatic phenomenon

Bernard Dubos[a], Roberto Hermosa[b], José Beltran[b], Victor Baron[a] and Enrique Torres[b]

a CIRAD , UPR Systèmes de pérennes, 34398 Montpellier, France.
b DANEC, km 1 ½ vía Sangolqui, Tambillo, Sangolqui, Ecuador

Ecuador is the second palm oil producing country in Latin America, with roughly **300,000 ha** cultivated. Most plantations are located in the western coastal area (**Region of Quinindé**).



In this region the oil palm often presents a rare form of **leaf yellowing**, locally known as *amarillamiento secamiento*, which has only been observed in this part of the world. Yellowing of leaves reduces photosynthetic activity and has a negative impact on biomass production.

➥ Those symptoms are often **confused with Mg deficiency**.


(Source Victor Baron)

Progression of leaf yellowing in 3 stages

Mineral deficiency is not the cause

- No relationship between yellowing and nutrients has been established in any of our fertilizer trials.
- Cyclical degradation and symptom resolution are frequently observed over short periods, which is not the case for nutrient deficiency.

Cyclical leaf yellowing: a symptom only observed in Ecuador

Initial symptoms appear at the tips of the fronds of the intermediate leaf . Yellowing and drying progresses from the distal end to the base of the leaf and later leaflets dry rapidly. The protection effect of shade, typical of Mg deficiency, has not been observed on lower leaflets.

Pictures taken in the same field from 2007 to 2009, illustrating the cyclical appearance and disappearance of symptoms in Quinindé

Symptoms disappearance after El Niño : evidence suggests a climatic origin

- Average rainfall and sunshine values are considered as limiting, with a long dry season and low annual sunshine (<1200hours) .
- Changes in climatic conditions during El Niño results in a simultaneous **increase of rainfall**, **sunshine and temperature** during 14 to 18 months.
- Large scale resolution of yellowing symptoms has been reported following the apparition of ENSO (El Niño Northern Oscillation) when it occurred in 1983 and 1997.

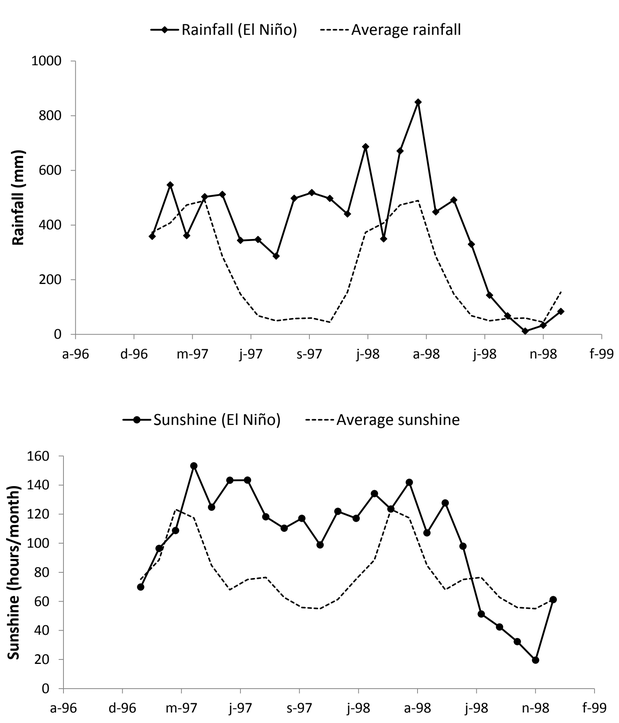


Fig1: Monthly rainfall and sunshine during El Niño 1997-1998.

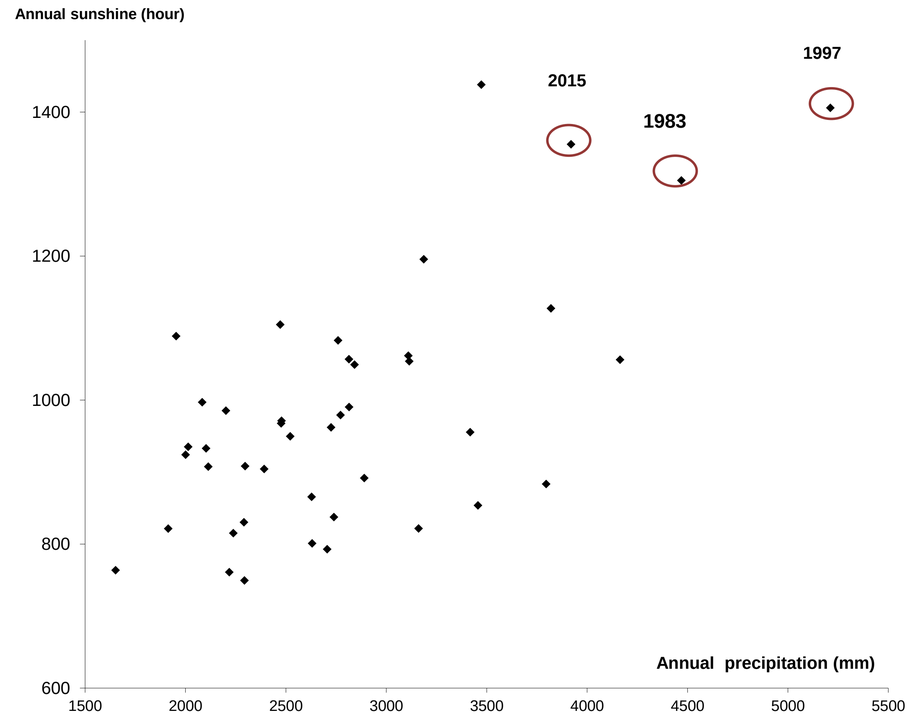


Fig2: Total annual sunshine and precipitation.

Conclusion

Our observations suggests that the cyclical leaf yellowing in western Ecuador has a **climatic origin**, and that El Niño events result in the disappearance of symptoms thanks to improved climatic conditions during the dry season**.**

- **Improvement in foliage quality is expected in 2016** as a consequence of El Niño in 2015.
- Disappearance of yellowing symptoms would confirm that poor climatic conditions are the cause of this unique form of disturbance.
- Positive effect on yields is also expected in 2016 and 2017.